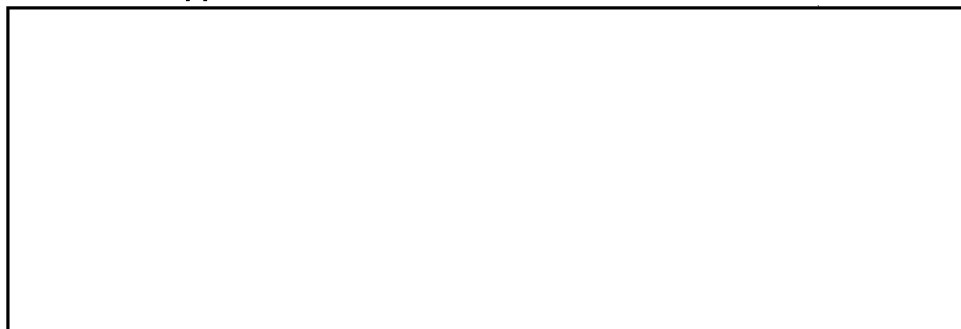


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January 1964



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Enclosed are five copies of Technical Report  
No. 1 on the above-referenced contract.



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WB:aq

Enclosures: Technical Report No. 1 (5 copies)

cc:   
Contracting Officer

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declassification

Declass Review by  
NIMA/DOD

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Technical Report No. 1

Government Contract [REDACTED]  
[REDACTED]

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a. Current Status of Work

The following areas have been worked on during this period.

1. The equipment should cover a frequency range from a few to 1000 lines/mm. The requirements are shown in fig. 11-2 of our proposal. We now have to choose the power of the zoom system such as to give in Image Plane 2 a size for the necessary filters that are reasonable to make, while the power of the eyepiece is such that the target and filter is easily seen and judged by the eye. The following choice was arrived at. As a filter we would use one frequency of 15 lines/mm and one frequency of 1 line/mm.

As a zoom system we will use a [REDACTED] 25X1A  
microscope with a zoom range of 2:1. With this choice we can use four objectives: 40X; 20X; 10X, and 5X.

Table I shows the ranges one can cover with this equipment.

It is clear from this Table that all desired line frequencies are covered with this arrangement. All that is needed is a [REDACTED] microscope with a quadruple nose-piece. This was bought and is delivered.

Table 1

Filter: 15 lines/mm

Zoom: 2:1

<u>Objective</u>	<u>Range</u>
40X	600-1200 lines/mm
20X	300-600 lines/mm
10X	150-300 lines/mm
5X	75-150 lines/mm

Filter: 1 line/mm

Zoom: 2:1

<u>Objective</u>	<u>Range</u>
40X	40-80 lines/mm
20X	20-40 lines/mm
10X	10-20 lines/mm
5X	5-10 lines/mm

2. In order to have an objective measurement we have to introduce a split field arrangement close to Image Plane 2, indicated in Fig. II-2 of our proposal. Some tests were performed with a setup as shown in Fig. 1.

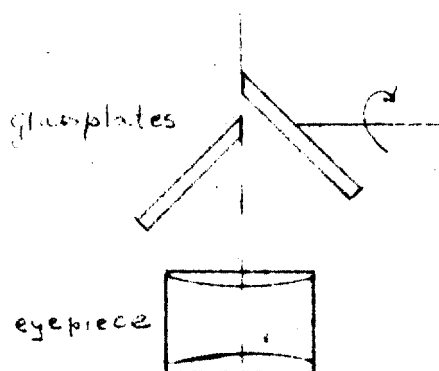


Fig. 1

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The desired goal is to split the field in two halves with a sharp dividing line between the two halves. The shown inclination of the glass plates in fig. 1 allows us to effectively get a sharp dividing line. A rotation around axis a, as shown in the figure, will displace one-half of the field. This is necessary because of the way the filter is used (a phase change of  $180^\circ$ ) and for the phase measurements. Fig. 2 shows the effect of this arrangement in a crude form.

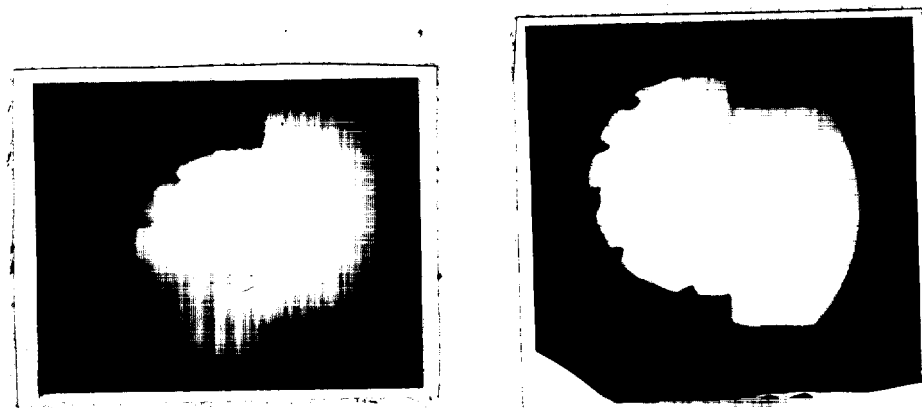


Fig. 2

3. Various possibilities were discussed for the target holder. It was decided to postpone any work on this until we had more information about the equipment on which the sine wave tester was to be used.

A start was made on the evepiece requirements since it had to have an accessible object-plane, which is not

the case on ordinary microscope objectives.

A search was initiated to obtain information about available microscope objectives and their quality. The best quality microscope objectives should be used, since their quality will affect the measurements.

b. Problem Areas Encountered

No problem areas were encountered during this phase of the contract.

c. Projected Work for Next Monthly Period

1. Refine the split-field device.
2. Decide on the necessary eyepiece.
3. Get acquainted with the equipment on which sine wave tester is to be used.
4. Continue the investigation on available microscope objectives.
5. Decide on target arrangement.
6. If time permits, build a preliminary mock-up to test the accuracy of the set-up.

d. Status of Funds Expended

From the period of December 1, 1964 to December 31, 1964 the sum of [ ] was spent on subject contract. This figure includes direct labor, materials, overhead and G. and A. and fixed fee.

- e. Documentation of any verbal commitments and/or agreements with the Technical Representatives of the Contracting Officer during the reporting period.

The following oral agreements were made with your personnel at a meeting at [ ] on the 17th of

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December 1964. Present at the meeting were two of your representatives. The following decisions were made.

1. Our customer would start collecting data on the equipment on which the sine wave tester is to be used. Then a possible visit is to be arranged so that the equipment can be seen.
2. The customer would start making the filters of 15 lines/mm and 1 line/mm. They agreed to give us some of the preliminary results so we could experiment with them.

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Submitted by



20 January 1964

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